

CROSSED ROLLER BEARING



Crossed Roller Bearings

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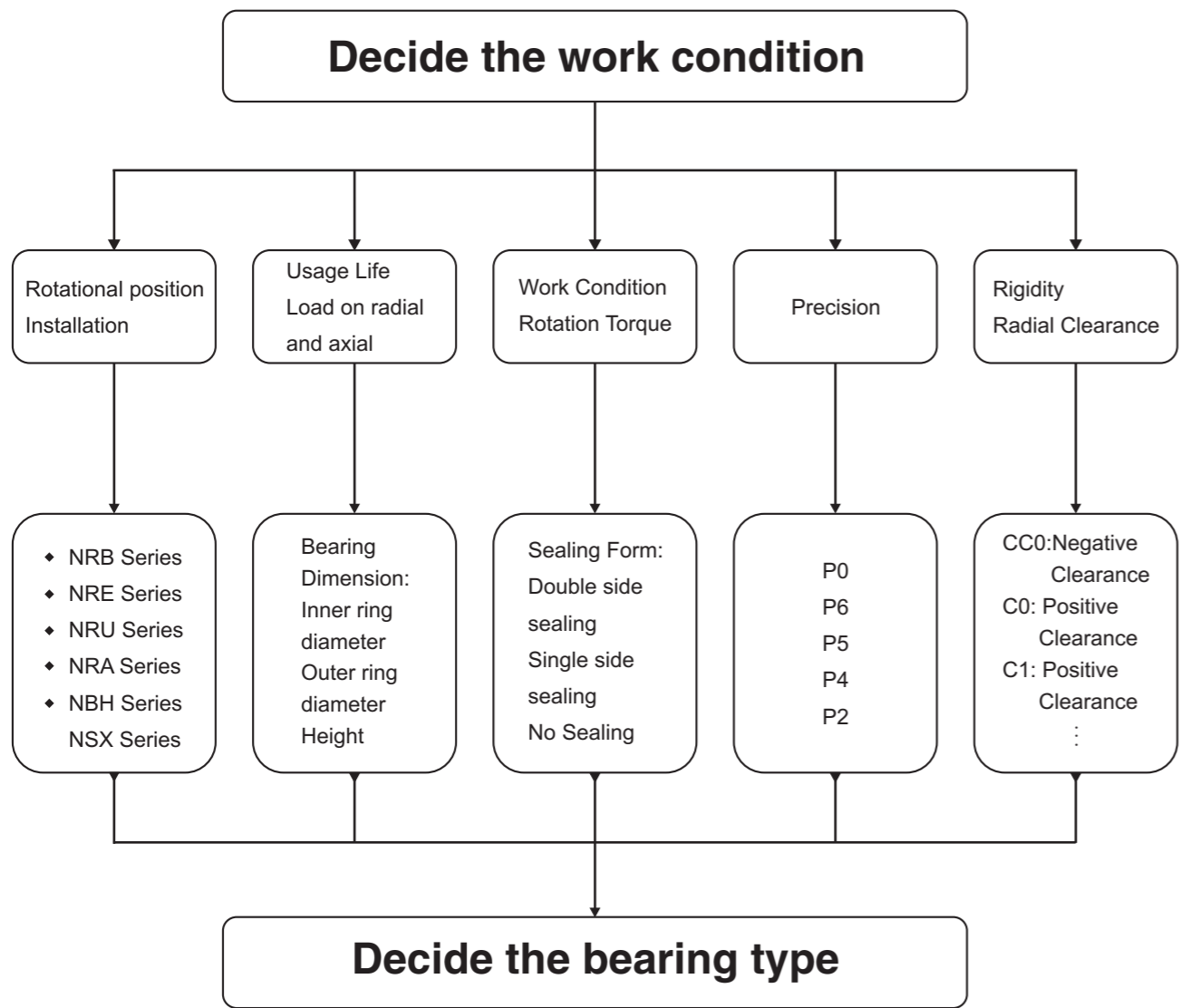
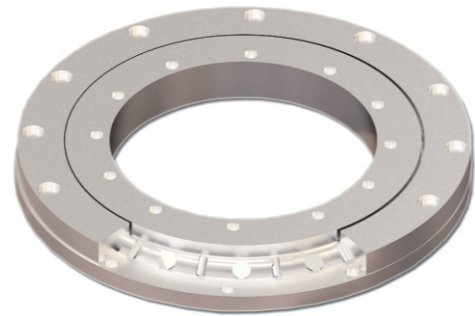
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Crossed roller bearings are bearings for high precision applications, whose dimensions confirm to ISO dimension series 18 to DIN 616. They comprise outer rings, inner rings, rolling elements and plastic spacers. The outer ring is split and is held together by three retaining rings.

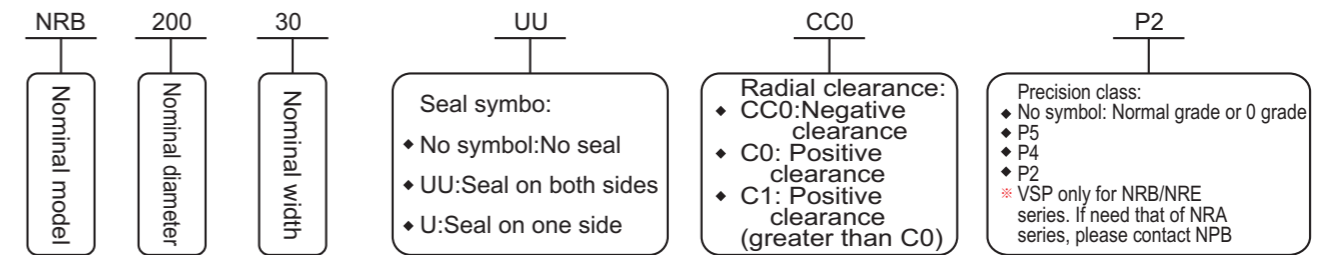
Due to the X arrangement of the cylindrical rollers, these bearings can support axial forces from both directions as well as radial forces, tilting moment loads and any combination of loads by means of a single bearing position. As result, designs involving two bearing positions can be reduced to a single bearing position.



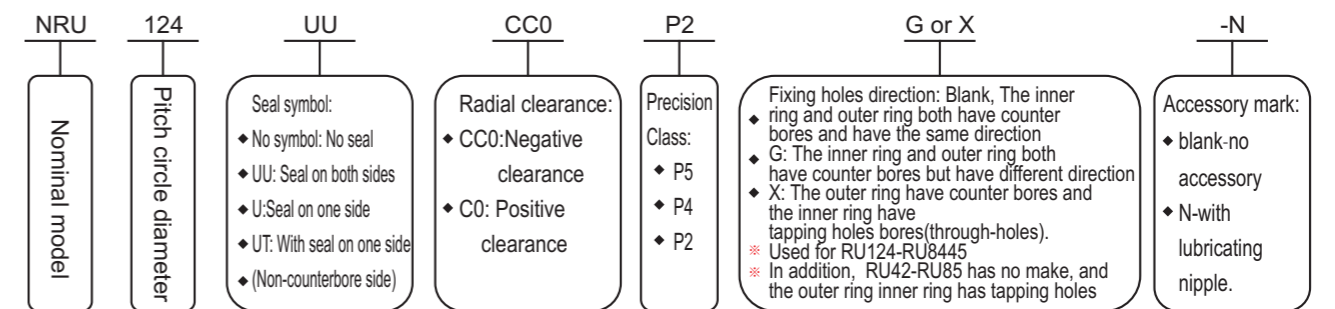
Bearing Selection

Name rules

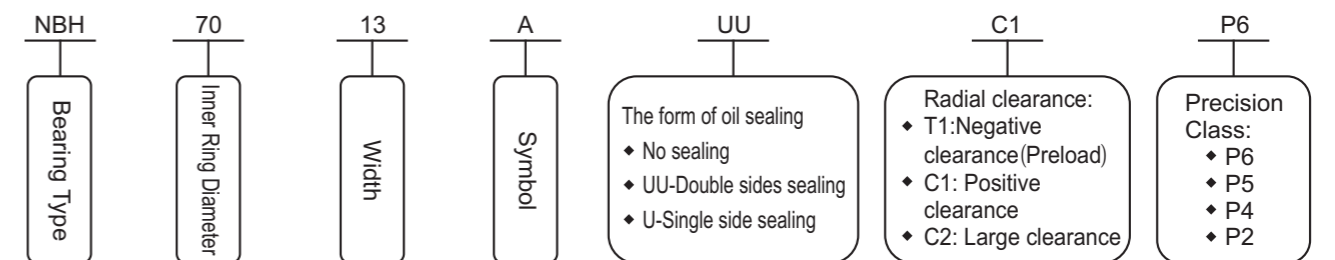
The Rules of NRB Bearings Identification



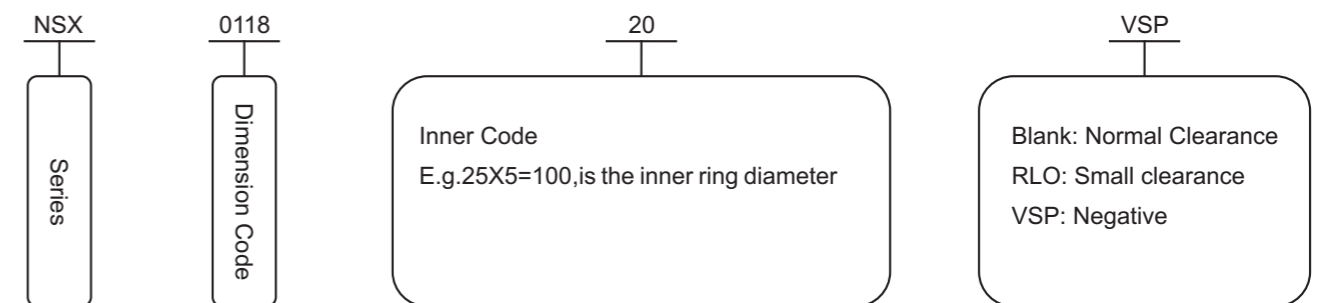
The Rules of NRU Bearings Identification



The Rules of NBH Bearings Identification



The Rules of NSX Bearings Identification





Design and Installation Guide

Basic Bearing Rated Life

When a lot of similar bearings rotate under the same conditions, rolling fatigue will not occur on 90% of those bearings. The total number of revolutions of them is called "basic rated life of the bearings". Please see below equation of for calculating of the bearing life on the basic rated dynamic load.

$$L = \left(\frac{C}{P}\right)^{\frac{10}{3}} \times 10^6$$

Here: L—basic rated life, the units is the number of rotations
 P: equivalent dynamic load
 C: basic rated dynamic load (Please see details from the dimension table)
 The units of P is the same with that of C, is N.

When the bearings carry the loads from radial direction, axial direction, and overturning moment, supposed that aforementioned synthesis of a variety of load is a load which is acting on the bearing center, the imaginary load which is acting on the center of the bearing is the equivalent dynamic load as P, which should be equal to the following equations:

$$P = X \left(F_r + \frac{2M}{D_{pw}} \right) + Y F_a$$

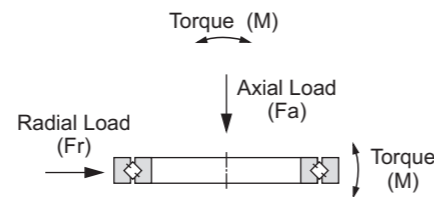
Fr Here radial load

Fa Here Axial load

M Here Moment load (N·m or Kgf·mm)

X and Y is the radial load factor or axial load factor separately

Please contact with Hong yuan if you need the details



pitch diameter $D_{pw} = \frac{\text{Inner Ring Diameter } d + \text{Outer Ring Diameter } D}{2}$ unit symbol: mm

And the actual life of cross roller bearings rests on the bearing selection, quality of materials, structures, processes, the design of the environment, the running environment and the installation and maintenance. The fatigue is not only the main forms of the crossed roller bearing failure, Cross roller bearings have high rotary precision, and usually fail due to the wear and tear of the rolling body, raceway, and the cage, (occur axial and radial clearance), or other abnormal using damage. Bearings may also is not show fatigue damage, so basic rated life can only be a reference to the crossed roller bearing use life.

Static load safety factor

When the bearings carry complex load from radial, axial and overturning moment, The rolling element and raceway withstanding a maximum load may suffer permanent deformation. If one hypothetical load can make the same effect, this hypothetical load is the equivalent static load, and the formula is:

$$P_o = P_r + \frac{2M}{D_{pw}} + 0.44F_a$$

Here: Po equivalent static load
 Fr Here radial load
 Fa Here Axial load
 M Here Moment load (N·m or Kgf·mm)

pitch diameter unit symbol: mm

Safety factor

Safety factor(FS) mainly depends on the basic static load rating(Co) and static equivalent load(Po), as shown in the following:

$$F_3 = \left(\frac{C_o}{P_o}\right)$$

pitch diameter $D_{pw} = \frac{\text{Inner Ring Diameter } d + \text{Outer Ring Diameter } D}{2}$ unit symbol: mm

Among them, Co and Po respectively are the basic static load rating and static equivalent load. The unit must be the same, may be N or Kgf; but the Safety factor may be selected from 1.5 to 3.5 according to the working condition, for details, please contact NPB

working condition	safety factor
Standard	≥ 1.5
Shake	≥ 2
High speed, high precision	≥ 3.5



The Precision of The Bearings

The rotation precision for Inner of NRB series

unit: μm

Inner ring(d) (mm)		Inner ring radial run out					Inner axial run out				
Upon	Below	P0 precision	P6 precision	P5 precision	P4 precision	P2 precision	P0 precision	P6 precision	P5 precision	P4 precision	P2 precision
18	30	13	8	4	3	2.5	13	8	4	3	2.5
30	50	15	10	5	4	2.5	15	10	5	4	2.5
50	80	20	10	5	4	2.5	20	10	5	4	2.5
80	120	25	13	6	5	2.5	25	13	6	5	2.5
120	150	30	18	8	6	2.5	30	18	8	6	2.5
150	180	30	18	8	6	5	30	18	8	6	5
180	250	40	20	10	8	5	40	20	10	8	5
250	315	50	25	13	10	—	50	25	13	10	—
315	400	60	30	15	12	—	60	30	15	12	—
400	500	65	35	18	14	—	65	35	18	14	—
500	630	70	40	20	16	—	70	40	20	16	—
630	800	80	—	—	—	—	80	—	—	—	—
800	1000	90	—	—	—	—	90	—	—	—	—
1000	1250	100	—	—	—	—	100	—	—	—	—

The rotation accuracy for Outer ring of NRE series

unit: μm

Inner ring(D) (mm)		Radial run out of outer ring					Axial run out of outer ring				
Upon	Below	P0 precision	P6 precision	P5 precision	P4 precision	P2 precision	P0 precision	P6 precision	P5 precision	P4 precision	P2 precision
30	50	20	10	7	5	2.5	20	10	7	5	2.5
50	80	25	13	8	5	4	25	13	8	5	4
80	120	35	18	10	6	5	35	18	10	6	5
120	150	40	20	11	7	5	40	20	11	7	5
150	180	45	23	13	8	5	45	23	13	8	5
180	250	50	25	15	10	7	50	25	15	10	7
250	315	60	30	18	11	7	60	30	18	11	7
315	400	70	35	20	13	8	70	35	20	13	8
400	500	80	40	23	15	—	80	40	23	15	—
500	630	100	50	25	16	—	100	50	25	16	—
630	800	120	60	30	20	—	120	60	30	20	—
800	1000	120	75	—	—	—	120	75	—	—	—
1000	1250	120	—	—	—	—	120	—	—	—	—
1250	1600	120	—	—	—	—	120	—	—	—	—



Rotation accuracy of NRU series inner ring unit: μm

Bearing NO.	Radial run out of inner ring			Axial run out of inner ring		
	P5	P4	P2	P5	P4	P2
NRU42	4	3	2.5	4	3	2.5
NRU66	5	4	2.5	5	4	2.5
NRU85	5	4	2.5	5	4	2.5
NRU124	5	4	2.5	5	4	2.5
NRU148	6	5	2.5	6	5	2.5
NRU178	6	5	2.5	6	5	2.5
NRU228	8	6	5	8	6	5
NRU297	10	8	5	10	8	5
NRU445	15	12	7	15	12	7

Rotation accuracy of NRU series inner ring unit: μm

Bearing NO.	Radial run out of inner ring			Axial run out of inner ring		
	P5	P4	P2	P5	P4	P2
NRU42	8	5	4	8	5	4
NRU85	10	6	5	10	6	5
NRU124	10	6	5	10	6	5
NRU148	13	8	5	13	8	5
NRU178	15	10	7	15	10	7
NRU228	15	10	7	15	10	7
NRU297	18	11	7	18	11	7
NRU445	20	13	8	20	13	8
	25	16	10	25	16	10

※ P5 is the basic rotation precision of NRU series.

The rotation accuracy for inner of NRA series unit: μm

Inner ring(d) (mm)		Axial / radial run out
Upon	Below	
40	65	13
65	80	15
80	100	15
100	120	20
120	140	25
140	180	25
180	200	30



NRB/NRE Dimension tolerance of the inner ring unit: μm

Inner ring(d) (mm)		Tolerance for inner ring							
		P0		P6		P5		P4, P2	
Upon	Below	High	Low	High	Low	High	Low	High	Low
18	30	0	-10	0	-8	0	-6	0	-5
30	50	0	-12	0	-10	0	-8	0	-6
50	80	0	-15	0	-12	0	-9	0	-7
80	120	0	-20	0	-15	0	-10	0	-8
120	150	0	-25	0	-18	0	-13	0	-10
150	180	0	-25	0	-18	0	-13	0	-10
180	250	0	-30	0	-22	0	-15	0	-12
250	315	0	-35	0	-25	0	-18	—	—
315	400	0	-40	0	-30	0	-23	—	—
400	500	0	-45	0	-35	—	—	—	—
500	630	0	-50	0	-40	—	—	—	—
630	800	0	-75	—	—	—	—	—	—
800	1000	0	-100	—	—	—	—	—	—
1000	1250	0	-125	—	—	—	—	—	—

※ The NRA and NRU basic inner ring accuracy is 0 class, if you need higher accuracy, please contact NPB. If the bearing inner ring accuracy class is “-”, you can refer to the highest values of the lower class.

NRB/NRE The dimension tolerance of the outer ring unit: μm

Outer ring(d) (mm)		Tolerance for outer ring							
		P0		P6		P5		P4, P2	
Upon	Below	High	Low	High	Low	High	Low	High	Low
18	30	0	-11	0	-9	0	-7	0	-6
30	50	0	-13	0	-11	0	-9	0	-7
50	80	0	-15	0	-13	0	-10	0	-8
80	120	0	-18	0	-15	0	-11	0	-9
120	150	0	-25	0	-18	0	-13	0	-10
150	180	0	-30	0	-20	0	-15	0	-11
180	250	0	-35	0	-25	0	-18	0	-13
250	315	0	-40	0	-28	0	-20	0	-15
315	400	0	-45	0	-33	0	-23	—	—
400	500	0	-50	0	-38	—	-28	—	—
500	630	0	-75	0	-45	—	-35	—	—
630	800	0	-100	—	—	—	—	—	—
800	1000	0	-125	—	—	—	—	—	—
1000	1250	0	-160	—	—	—	—	—	—

※ Remark: 1, NRA and NRU basic inner ring accuracy is 0 class, if need higher accuracy, please contact NPB.
2, If the bearing inner ring accuracy class is “-”, you can refer to the highest values of the lower class.



Width tolerance of the inner ring and outer rings for NRB/NRE series unit: μm

Inner ring(d) dimension (mm)		B tolerance		B1 tolerance	
		For NRB inner ring and NRE outer ring		For NRB outer ring and NRE inner ring	
Upon	Below	High	Low	High	Low
18	30	0	-75	0	-100
30	50	0	-75	0	-100
50	80	0	-75	0	-100
80	120	0	-75	0	-100
120	150	0	-100	0	-120
150	180	0	-100	0	-120
180	250	0	-100	0	-120
250	315	0	-120	0	-150
315	400	0	-150	0	-200
400	500	0	-150	0	-200
500	630	0	-150	0	-200
630	800	0	-150	0	-200
800	1000	0	-300	0	-400
1000	1250	0	-300	0	-400

※ Remark: The tolerance of B and B1 for NRA series are in the region of $-0.12\sim 0$ mm

The inner and outer ring tolerance for NRU series unit: μm

Bearing NO.	B tolerance	
	High	Low
NRU42	0	-75
NRU66	0	-75
NRU85	0	-75
NRU124	0	-75
NRU148	0	-75
NRU178	0	-100
NRU228	0	-100
NRU297	0	-100
NRU445	0	-100



Inner Ring Spacing Error Accuracy of NBH series unit: μm

Inner ring(d) (mm)		Inner Ring Tolerance				Height Tolerance	Radial Run-out					Axial Run-out									
		P0		P6			P5		P4/P2		P0	P6	P5	P4	P2	P0	P6	P5	P4	P2	
Above	Below	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low		
18	30	0	-10	0	-8	0	-6	0	-5	0	-75	13	8	4	3	2.5	13	8	4	3	2.5
30	50	0	-12	0	-10	0	-8	0	-6	0	-75	15	10	5	4	2.5	15	10	5	4	2.5
50	80	0	-15	0	-12	0	-9	0	-7	0	-75	20	10	5	4	2.5	20	10	5	4	2.5
80	120	0	-20	0	-15	0	-10	0	-8	0	-75	25	13	6	5	2.5	25	13	6	5	2.5
120	150	0	-25	0	-18	0	-13	0	-10	0	-100	30	18	8	6	2.5	30	18	8	6	2.5
150	180	0	-25	0	-18	0	-13	0	-10	0	-100	30	18	8	6	5	30	18	8	6	5
180	250	0	-30	0	-22	0	-15	0	-12	0	-100	40	20	10	8	5	40	20	10	8	5
250	315	0	-35	0	-25	0	-18	—	—	0	-120	50	25	13	10	7	50	25	13	10	7

NBH series outer ring accuracy unit: μm

Inner ring(d) (mm)		Inner Ring Tolerance				Height Tolerance	Radial Run-out					Axial Run-out									
		P0		P6			P5		P4/P2		P0	P6	P5	P4	P2	P0	P6	P5	P4	P2	
Above	Below	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low		
30	50	0	-11	0	-9	0	-7	0	-6	0	-100	20	10	7	5	2.5	20	10	7	5	2.5
50	80	0	-13	0	-11	0	-9	0	-7	0	-100	25	13	8	5	4	25	13	8	5	4
80	120	0	-15	0	-13	0	-10	0	-8	0	-100	35	18	10	6	5	35	18	10	6	5
120	150	0	-18	0	-15	0	-11	0	-9	0	-120	40	20	11	7	5	40	20	11	7	5
150	180	0	-25	0	-18	0	-13	0	-10	0	-120	45	23	13	8	5	45	23	13	8	5
180	250	0	-30	0	-20	0	-15	0	-11	0	-120	50	25	15	10	7	50	25	15	10	7
250	315	0	-35	0	-25	0	-18	0	-13	0	-150	60	30	18	10	7	60	30	18	11	7
315	400	0	-40	0	-28	0	-20	—	—	0	-200	70	35	20	—	—	70	35	20	—	—



NSX series accuracy

unit: μm

Bearing Type	Inner Diameter Tolerance(d)		Outer Diameter Tolerance(D)		Inner Ring Height(B)		Outer Ring Height(B1)		Inner Radial Run-out Kia	Inner Axial Run-out Sia
	High	Low	High	Low	High	Low	High	Low		
NSX011814	4	-15	0	-22	0	-10	10	-10	10	10
NSX011818	4	-18	0	-22	0	-10	12	-12	10	10
NSX011820	4	-18	0	-25	0	-15	12	-15	10	10
NSX011824	4	-18	0	-25	0	-15	12	-15	10	10
NSX011828	4	-21	0	-25	0	-15	12	-15	15	10
NSX011832	4	-21	0	-29	0	-25	12	-25	15	10
NSX011836	4	-21	0	-29	0	-25	13	-25	15	10
NSX011840	4	-24	0	-29	0	-25	13	-25	15	10
NSX011848	5	-24	0	-32	0	-25	13	-25	20	10
NSX011860	5	-27	0	-36	0	-50	14	-50	20	10
NSX011868	7	-29	0	-40	0	-50	14	-50	25	10
NSX011880	7	-29	0	-40	0	-50	15	-50	30	10
NSX0118/500	8	-32	0	-44	0	-50	16	-50	40	10

NXR Dimension table

Identification NO.	Inner ring d	Outer ring D	Width H	Chamfer	Basic load rating(radial) KN	Basic load rating(Axial) KN	Limited speed ⁹⁾ r/min	Weight kg
NXR 496051	203.2	279.4	31.75	1.5	51.3	61.6	800	6.5
NXR 637050	300	400	37	1.5	63	80.1	720	13
NXR 652050	310	425	45	2.5	82.2	102	640	20
NXR 678052	330.2	457.2	63.5	3.3	100	123	620	35
NXR 699050	370	495	50	3.0	93.6	119	600	30
NXR 766051	457.2	609.6	63.5	3.3	141	178	520	51
NXR 820060	580	760	80	6.4	215	234	300	100
NXR 855053	685.8	914.4	79.375	3.3	270	344	260	150
NXR 882055	901.7	1117.6	82.55	3.3	300	396	200	185
NXR 889058	1028.7	1327.15	114.3	3.3	405	534	160	400
NXR 897051	1549.4	1828.8	101.6	3.3	518	699	80	500



Clearance of Crossed Roller Bearings

NRU series radial clearance (Preload)

unit: μm

Bearing Type	CCO		CO	
	Starting Torque(N·m)		Radial Clearance(μ·m)	
	Min	Max	Min	Max
NRU42	0.1	0.5	0	25
NRU66	0.3	2.2	0	30
NRU85	0.4	3	0	40
NRU124	1	6	0	40
NRU148	1	10	0	40
NRU178	3	15	0	50
NRU228	5	20	0	60
NRU297	10	35	0	70
NRU445	20	55	0	100

※NRU series CC0 clearance depends on the starting torque which does not include the sealing resistance.

NRB,NRE series radial clearance (Preload)

unit: μm

Roller Pitch Diameter (Dpw) (mm)		CCO		CO		C1	
Above	Below	Min	Max	Min	Max	Min	Max
18	30	-8	0	0	15	15	35
30	50	-8	0	0	25	25	50
50	80	-10	0	0	30	30	60
80	120	-10	0	0	40	40	70
120	140	-10	0	0	40	40	80
140	160	-10	0	0	40	40	90
160	180	-10	0	0	50	50	100
180	200	-10	0	0	50	50	110
200	225	-10	0	0	60	60	120
225	250	-10	0	0	60	60	130
250	280	-10	0	0	80	80	150
280	315	-15	0	0	100	100	170
315	355	-15	0	0	110	110	190
355	400	-15	0	0	120	120	210
400	450	-15	0	0	130	130	230
450	500	-20	0	0	130	130	250
500	560	-20	0	0	15	15	280
560	630	-20	0	0	170	170	310
630	710	-20	0	0	190	190	350
710	800	-30	0	0	210	210	390
800	900	-30	0	0	230	230	430
900	1000	-30	0	0	260	260	480
1000	1120	-30	0	0	290	290	530
1120	1250	-30	0	0	320	320	580
1250	1400	-30	0	0	350	350	630

NBH series radial clearance (Preload)

unit: μm

Inner Diameter		T1		C1		C2	
Above	Below	Min	Max	Min	Max	Min	Max
—	30	-10	0	0	10	10	20
30	40	-10	0	0	10	10	20
40	50	-10	0	0	10	10	25
50	65	-10	0	0	10	10	25
65	80	-10	0	0	15	15	30
80	100	-10	0	0	15	15	35
100	120	-15	0	0	15	15	35
120	140	-15	0	0	20	20	45
140	160	-15	0	0	20	20	50
160	200	-15	0	0	20	20	50
200	250	-20	0	0	25	25	60
250	315	-20	0	0	35	35	60

NRA series radial clearance (Preload)

unit: μm

Roller Pitch Diameter (Dpw) (mm)		CCO		CO	
Above	Below	Min	Max	Min	Max
50	80	-8	0	0	15
80	120	-8	0	0	15
120	140	-8	0	0	15
140	160	-8	0	0	15
160	180	-10	0	0	20
180	200	-10	0	0	20
200	225	-10	0	0	20

NSX Inner clearance

unit: μm

Bearing Type	Basic Clearance				RLO		VSP	
	Radial Clearance		Axial Clearance		Radial Clearance		Radial Clearance	
	Min	Max	Min	Max	Min	Max	Min	Max
NSX011814	3	15	6	30	-6	3	-15	-3
NSX011818	3	15	6	30	-6	3	-15	-3
NSX011820	5	20	10	40	-8	4	-20	-5
NSX011824	5	20	10	40	-8	4	-20	-5
NSX011828	5	20	10	40	-8	4	-20	-5
NSX011832	5	20	10	40	-8	4	-20	-5
NSX011836	5	25	10	50	-10	5	-25	-5
NSX011840	5	25	10	50	-10	5	-25	-5
NSX011848	10	30	20	60	-10	5	-25	-5
NSX011860	10	40	20	80	-10	5	-25	-5
NSX011868	20	40	20	80	-10	5	-25	-5
NSX011880	10	50	20	100	-10	5	-25	-5
NSX0118/500	15	60	30	120	-12	6	-30	-5

※NSX series have no symbol followed, which stand for basic clearance.



Lubrication

Before the crossed roller bearing leaves the factory, some high-quality Lithium complex grease is injected in to the bearings. Be sure to replace grease lost over time to prevent friction drag and extend the life time of the bearing. You can add grease through the oil hole which connects with the grease groove of the inner ring or outer ring of the bearings. According to different use conditions, the grease supplement cycle is approximately 1-6 months. Please fill with the same grease when supplementing, to ensure uniform distribution in the bearing internal structure. The sealed cross roller bearing may extend the lubrication cycle suitably. adding

After add the grease, the lubrication torque may rise temporarily, when the over grease overflows from the oil seal. The lubrication torque will return to normal level in short time.

If the bearings work in adverse condition such as strong shaking, of strong shake, vacuum, high temperature, low temperature, low temperature, or other special condition, common grease can not be used, please contact NPB.

The design for the axis and the bearing set and the installment

The design for the bearing set and the fixed flange

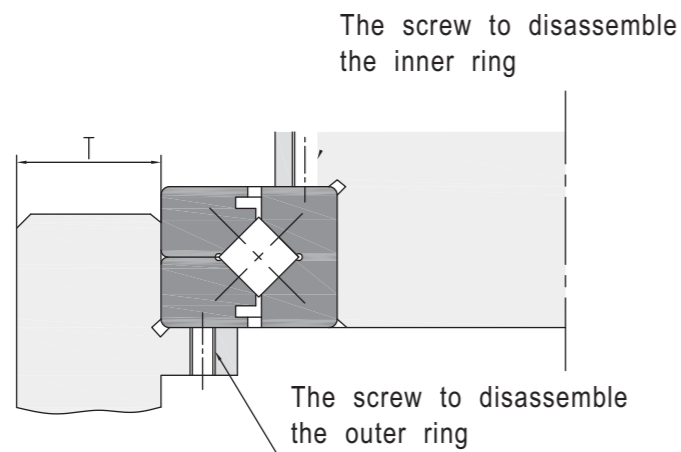
Because crossed roller bearings are a thin section structure, you need to consider the rigidity of the bearing set and the fixed flange. The outer ring was divided into two parts. If the rigidity of the bearing set or fixed flange and the fixed bolts is not strong enough, the inner rings or outer rings can not be fixed uniformly. Then the bearings will to become deformed. Therefore the contact area of the roller and the raceway will be misaligned and the performance will suffer.

Bearing set

The wall thickness of the bearing set, must be designed at 60% of the bearing section height.

The wall thickness of the bearing set $T = \frac{D-d}{2} \times 0.6_{up}$ (D: Outer ring diameter, d:Inner ring diameter)

If the bearing has a threaded hole which is used for disassembly of the outer and inner rings, the bearings will not be damaged during disassembly.



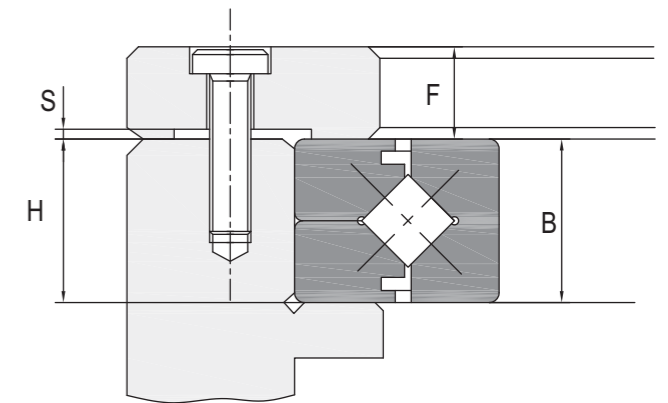
Fixed flange and fixing bolts

The wall thickness of fixed flange(F)and the gap of that(S), please adhere to the following dimensions. Besides, for the fixed bolts quantity, though more fixed bolts, more stable, but as the basic parameters, you can use below table for you reference to make equidistant configuration, you can use suitable torque to screw the bearings.

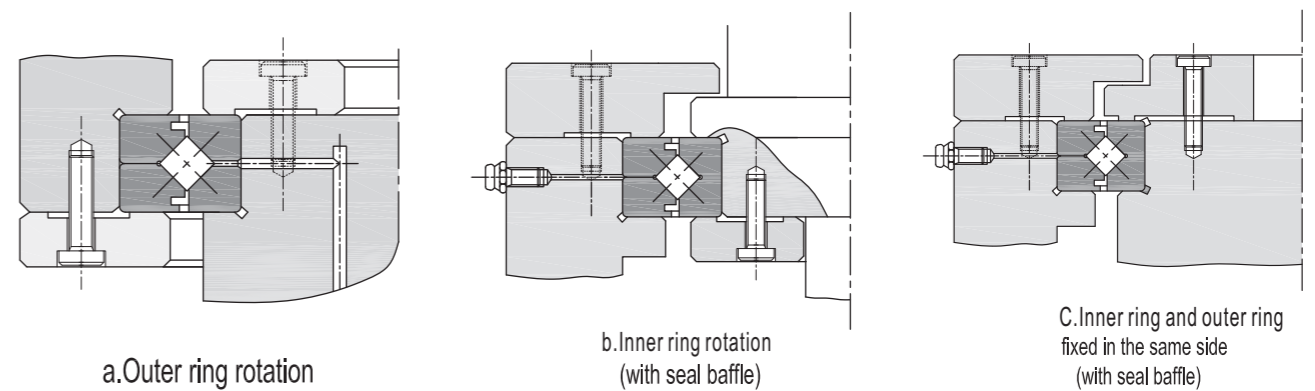
$$F = B \times 0.5 \sim B \times 1.2$$

$$H = B^{0}_{-0.1}$$

$$S = 0.5mm$$



Assemble Example





At the same time, though the material of the shaft or the bearing set alloy, it is advised to use steel in the construction of a fixed flange. When locking a fixed bolt, please screw the bolts tight with the torque spanner. If the bearing set or the fixed flange uses general medium-hard steel, please see the locking torque showed in following charts.

Table 18 The QTY and Dimensions of Fixing Bolts unit: μm

Outer ring dimension (D)		Qty of Bolts	Bolts dimension (basic)
Above	Below		
—	100	8 or more	M3~M5
100	200	12 or more	M4~M8
200	500	16 or more	M5~M12
500	—	24 or more	12 or much

Table 19 The locking torque of the bolts unit: μm

Nominal Model of Screws	The locking torque	Nominal Model of Screws	The locking torque
M3	2	M10	70
M4	4	M13	120
M5	9	M16	200
M6	14	M20	390
M8	30	M22	530

The fit tolerance of the bearing installation.

The fit tolerance of NRB series NRE series NRA series, and the fit of NRB series. NRE series and NRA series, please see the combination shown in below table.

The Fit of NRB, NRE and NRA series

unit: μm

Radial Clearance(Preload)		Work Condition	Shaft	Bearing set
C0	Inner Ring Rotation	Common Load	h5	H5
		Impact or large torque	h5	H5
	Outer Ring Rotation	Common Load	g5	J5
		Impact or large torque	g5	J5
C1	Inner Ring Rotation	Common Load	j5	J5
		Impact or large torque	k5	H5
	Outer Ring Rotation	Common Load	g5	J5
		Impact or large torque	h5	K5

※ 1. For the fit of clearance C0, you need avoid the interference fit, or excessive preload will occur. When the selected clearance C0 is used on the machinery's joint or rotating parts. The fits should select the combination of G5 and H7.

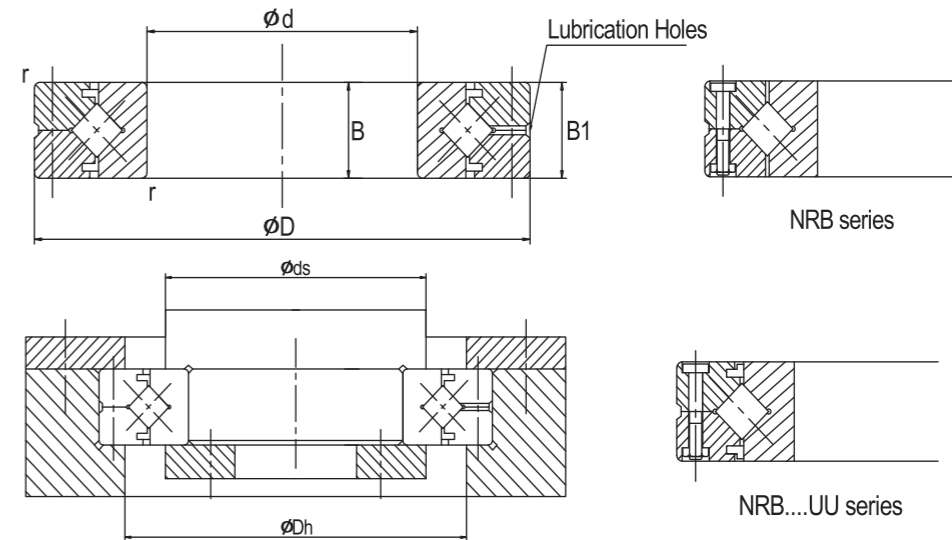
※ 2. There is no fit requirement for NRU series and NBH series. When there is position accuracy requirement on the installment, we suggest to selecting h7 and H7.

※ 3. For a higher precision bearing fit, please contact NPB.



Dimensions and series

NRB series(Outer ring division type , inner rotating)



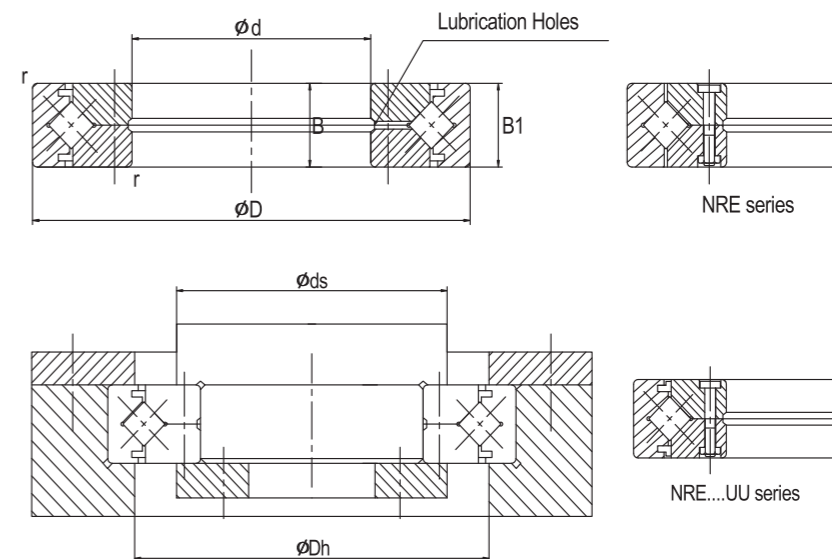
Bearing Type	Dimensions						Shoulder Height		Basic Load Rating (Radial)		Weight Kg
	Inner Ring	Outer Ring	Roller Pitch Diameter	Height		Chamfer	d_s	D_h	Cr KN	C0r KN	
	d	D	Dpw	B	B1						
NRB 3010	30	55	41.5	10	0.6		37	47	7.35	8.36	0.12
NRB 3510	35	60	46.5	10	0.6		41	51.5	7.64	9.12	0.13
NRB 4010	40	65	51.5	10	0.6		47.5	57.5	8.33	10.6	0.16
NRB 4510	45	70	56.5	10	0.6		51	61.5	8.62	11.3	0.17
NRB 5013	50	80	64	13	0.6		57.4	72	16.7	20.9	0.27
NRB 6013	60	90	74	13	0.6		68	82	18	24.3	0.3
NRB 7013	70	100	84	13	0.6		78	92	19.4	27.7	0.35
NRB 8016	80	120	98	16	0.6		91	111	30.1	42.1	0.7
NRB 9016	90	130	108	16	1		98	118	31.4	45.3	0.75
NRB 10016	100	140	119.3	16	1		109	129	31.7	48.6	0.83
NRB 10020		150	123	20	1		113	133	33.1	50.9	1.45
NRB 11012	110	135	121.8	12	0.6		117	127	12.5	24.1	0.4
NRB 11015		145	126.5	15	0.6		122	136	23.7	41.5	0.75
NRB 11020		160	133	20	1		120	143	34	54	1.56
NRB 12016	120	150	134.2	16	0.6		127	141	24.2	43.2	0.72
NRB 12025		180	148.7	25	1.5		133	164	66.9	100	2.62
NRB 13015	130	160	144.5	15	0.6		137	152	25	46.7	0.72
NRB 13025		190	158	25	1.5		143	174	69.5	107	2.82



Bearing Type	Dimensions						Shoulder Height		Basic Load Rating (Radial)		Weight Kg
	Inner Ring	Outer Ring	Roller Pitch Diameter	Height		Chamfer r _{min}	d _s	D _h	Cr	C0r	
	d	D	Dpw	B	B1				KN	KN	
NRB 14016	140	175	154.8	16	1	147	162	25.9	50.1	1	
NRB 14025		200	168	25	1.5	154	185	74.8	121	2.96	
NRB 15013	150	180	164	13	0.6	457	172	27	53.5	0.68	
NRB 15025		210	178	25	1.5	164	194	76.8	128	3.16	
NRB 15030		230	188	30	1.5	173	211	100	156	5.3	
NRB 16025	160	220	188.6	25	1.5	173	204	81.7	135	3.14	
NRB 17020	170	220	191	20	1.5	184	198	29	62.1	2.21	
NRB 18025	180	240	210	25	1.5	195	225	84	143	3.44	
NRB 19025	190	240	211.9	25	1	2020	222	41.7	82.9	2.99	
NRB 20025	200	260	230	25	2	215	245	84.2	157	4	
NRB 20030		280	240	30	2	221	258	114	200	6.7	
NRB 20035		295	247.7	35	2	225	270	151	252	9.6	
NRB 22025	220	280	250.1	25	2	235	265	92.3	171	4.1	
NRB 24025	240	300	269	25	2.5	256	281	68.3	145	4.5	
NRB 25025	250	310	277.5	25	2.5	265	290	69.3	150	5	
NRB 25030		330	287.5	30	2.5	269	306	126	244	8.1	
NRB 25040		355	300.7	40	2.5	275	326	195	348	14.8	
NRB 30025	300	360	328	25	2.5	315	340	76.3	178	5.9	
NRB 30035		395	345	35	2.5	322	368	183	367	13.4	
NRB 30040		405	351.6	40	2.5	326	377	212	409	17.2	
NRB 35020	350	400	373.4	20	2.5	363	383	54.1	143	3.9	
NRB 40035	400	480	440.3	35	2.5	422	459	156	370	14.5	
NRB 40040		510	453.4	40	2.5	428	479	241	531	23.5	
NRB 45025	450	500	474	25	1	464	484	61.7	182	6.6	
NRB 50025	500	550	524.2	25	1	514	534	65.5	201	7.3	
NRB 50040		600	548.8	40	2.5	526	572	239	607	26	
NRB 50050		625	561.6	50	2.5	536	587	267	653	41.7	
NRB 60040	600	700	650	40	3	627	673	264	721	29	
NRB 70045	700	815	753.5	45	3	731	777	281	836	46	
NRB 80070	800	950	868.31	70	4	836	900	468	1330	105	
NRB 90070	900	1050	969	70	4	937	1001	494	1490	120	
NRB 1000110	1000	1250	1114	110	5	1057	1171	1220	3220	360	
NRB 1250110	1250	1500	1365.8	110	5	1308	1423	1350	3970	440	



NRE series (Inner ring division type, outer rotating)



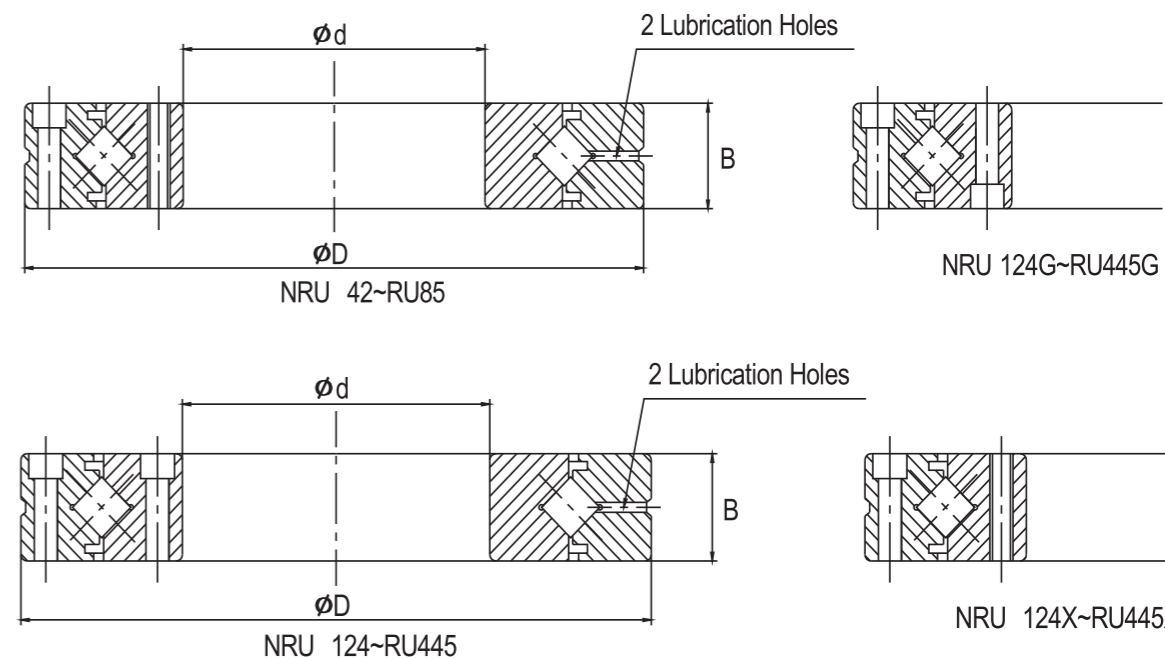
Bearing Type	Dimensions						Shoulder Height		Basic Load Rating (Radial)		Weight Kg
	Inner Ring	Outer Ring	Roller Pitch Diameter	Height		Chamfer r _{min}	d _s	D _h	Cr	C0r	
	d	D	Dpw	B	B1				KN	KN	
NRE 2008	20	36	29	8	0.5	23.5	30.5	3.23	3.1	0.04	
NRE 2508	25	41	34	8	0.5	28.5	35.5	3.63	3.83	0.05	
NRE 3010	30	55	43.5	10	0.6	37	47	7.35	8.36	0.12	
NRE 3510	35	60	48.5	10	0.6	41	51.5	7.64	9.12	0.13	
NRE 4010	40	65	53.5	10	0.6	47.5	57.5	8.33	10.6	0.16	
NRE 4510	45	70	58.5	10	0.6	51	61.5	8.62	11.3	0.17	
NRE 5013	50	80	66	13	0.6	57.4	72	16.7	20.9	0.27	
NRE 6013	60	90	76	13	0.6	68	82	18	24.3	0.3	
NRE 7013	70	100	86	13	0.6	78	92	19.4	27.7	0.35	
NRE 8016	80	120	101.4	16	0.6	91	111	30.1	42.1	0.7	
NRE 9016	90	130	112	16	1	98	118	31.4	45.3	0.75	
NRE 10016	100	140	121.1	16	1	109	129	31.7	48.6	0.83	
NRE 10020		150	127	20	1	113	133	33.1	50.9	1.45	
NRE 11012	110	135	12.3	12	0.6	117	127	12.5	24.1	0.4	
NRE 11015		145	129	15	0.6	122	136	23.7	41.5	0.75	
NRE 11020		160	137	20	1	120	143	34	54	1.56	
NRE 12016	120	150	136	16	0.6	127	141	24.2	43.2	0.72	
NRE 12025		180	152	25	1.5	133	164	66.9	100	2.62	
NRE 13015	130	160	146	15	0.6	137	152	25	46.7	0.72	
NRE 13025		190	162	25	1.5	143	174	69.5	107	2.82	



Bearing Type	Dimensions						Shoulder Height		Basic Load Rating (Radial)		Weight Kg
	Inner Ring	Outer Ring	Roller Pitch Diameter	Height	Chamfer	d _s	D _h	Cr	C0r		
	d	D	Dpw	B B1	r _{min}			KN	KN		
NRE 14016	140	175	160	16	1	147	162	25.9	50.1	1	
NRE 14025		200	172	25	1.5	154	185	74.8	121	2.96	
NRE 15013	150	180	166	13	0.6	158	172	27	53.5	0.68	
NRE 15025		210	182	25	1.5	164	194	76.8	128	3.16	
NRE 15030		230	192	30	1.5	173	211	100	156	5.3	
NRE 16025	160	220	192	25	1.5	173	204	81.7	135	3.14	
NRE 17020	170	220	196.1	20	1.5	184	198	29	62.1	2.21	
NRE 18025	180	240	210	25	1.5	195	225	84	143	3.44	
NRE 19025	190	240	219	25	1	202	222	41.7	82.9	2.99	
NRE 20025	200	260	230	25	2	215	245	84.2	157	4	
NRE 20030		280	240	30	2	221	258	114	200	6.7	
NRE 20035		295	247.7	35	2	225	270	151	252	9.6	
NRE 22025	220	280	250.1	25	2	235	265	92.3	171	4.1	
NRE 24025	240	300	272.5	25	2.5	256	281	68.3	145	4.5	
NRE 25025	250	310	280.9	25	2.5	268	290	69.3	150	5	
NRE 25030		330	287.5	30	2.5	269	306	126	244	8.1	
NRE 25040		355	300.7	40	2.5	275	326	195	348	14.8	
NRE 30025	300	360	332	25	2.5	315	340	76.3	178	5.9	
NRE 30035		395	345	35	2.5	322	368	183	367	13.4	
NRE 30040		405	351.6	40	2.5	326	377	212	409	17.2	
NRE 35020	350	400	376.6	20	2.5	363	383	54.1	143	3.9	
NRE 40035	400	480	440.3	35	2.5	422	459	156	370	14.5	
NRE 40040		510	453.4	40	2.5	428	479	241	531	23.5	
NRE 45025	450	500	476.6	25	1	464	484	61.7	182	6.6	
NRE 50025	500	550	526.6	25	1	514	534	65.5	201	7.3	
NRE 50040		600	548.8	40	2.5	526	572	239	607	26	
NRE 50050		625	561.6	50	2.5	536	587	267	653	41.7	
NRE 60040	600	700	650	40	3	627	673	264	721	29	



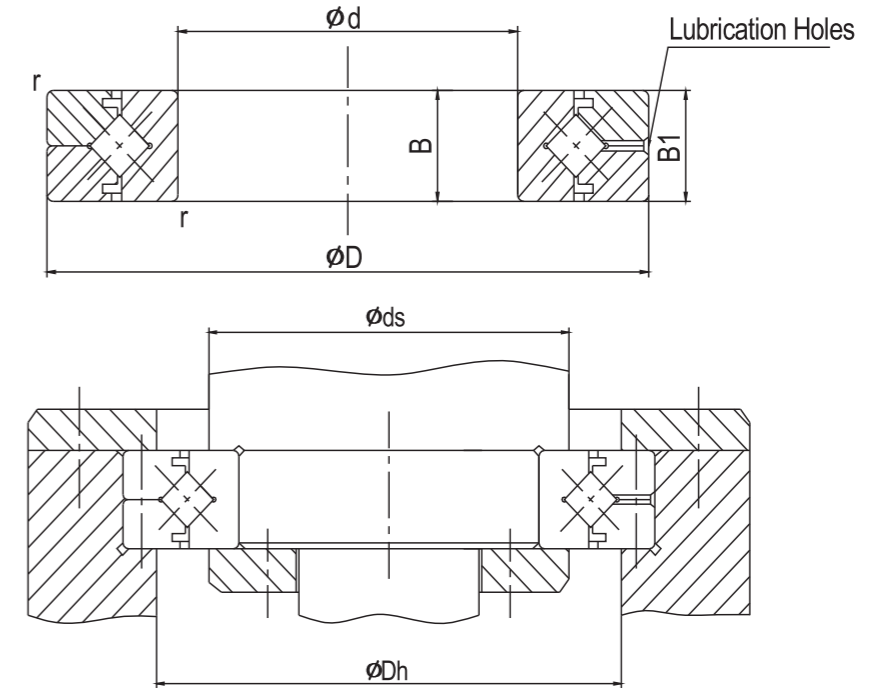
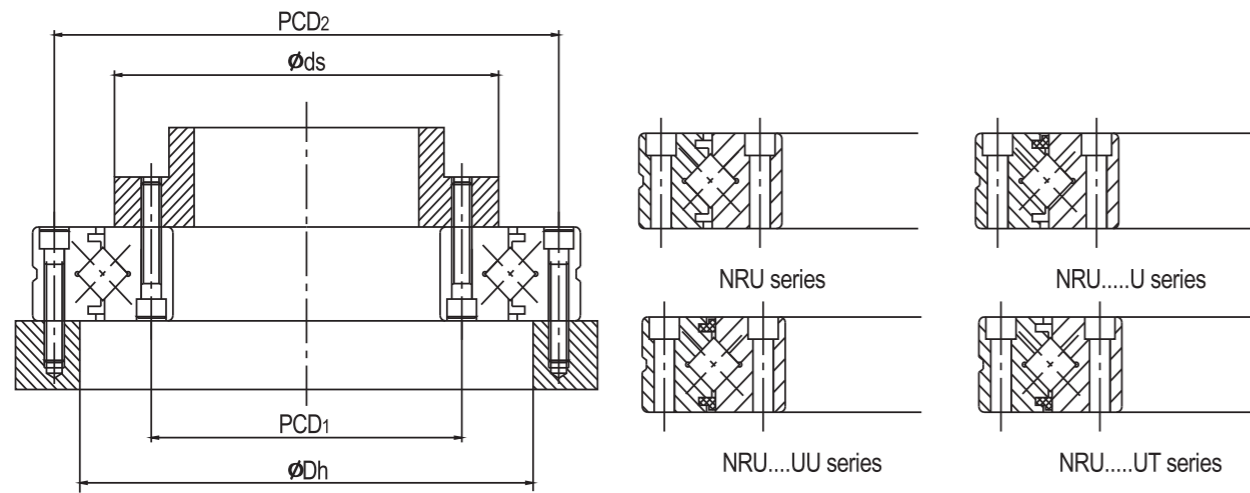
NRU series (Inner Ring Rotation/Outer Ring Rotation with fixing holes)



Bearing Type	Dimensions						Shoulder Height		Basic Load Rating (Radial)		Weight Kg
	Inner Ring	Outer Ring	Roller Pitch Diameter	Height	Chamfer	d _s	D _h	Cr	C0r		
	d	D	Dpw	B B1	r _{min}			KN	KN		
NRU 42	20	70	41.5	12	0.6	37	47	7.35	8.35	0.29	
NRU 66	25	95	66	15	0.6	59	76	17.5	22.3	0.62	
NRU 85	55	120	85	15	0.6	79	93	20.3	29.5	1	
NRU 124(G)	80	165	124	22	1	114	134	33.1	50.9	2.6	
NRU 124X											
NRU 148(G)	90	210	147.5	25	1.5	133	162	49.1	76.8	4.9	
NRU 148X											
NRU 178(G)	115	240	178	28	1.5	161	195	80.3	135	6.8	
NRU 178X											
NRU 228(G)	160	295	227.5	35	2	208	246	104	173	11.4	
NRU 228X											
NRU 297(G)	210	380	297.3	40	2.5	272	320	156	281	21.3	
NRU 297X											
NRU 445(G)	350	540	445.4	45	2.5	417	473	222	473	35.4	
NRU 445X											



NRA series (Inner Ring Integrity, Outer Ring Division, Thin Section)

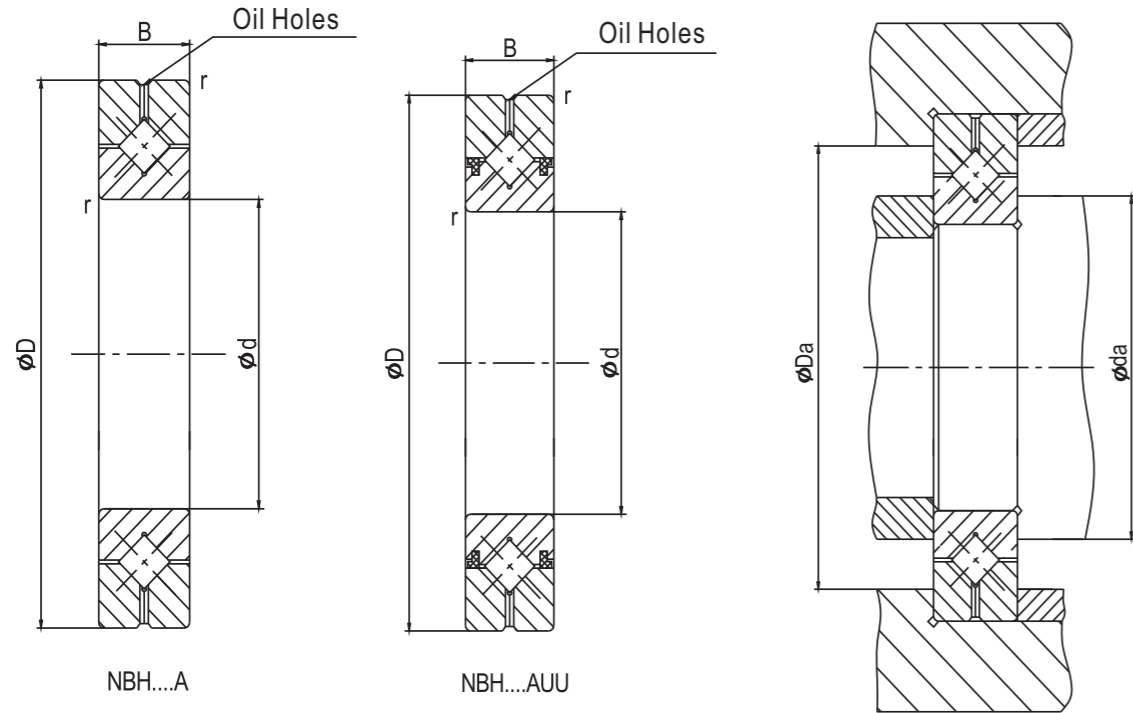


Inner Ring		Outer Ring		Similar with
Fixing Holes Center Diameter ϕD_1	Fixing Holes Dimension	Fixing Holes Center Diameter ϕD_2	Fixing Holes Dimension	
28	6-M3 Through Hole	57	6- $\phi 3.4$ Through Hole $\phi 6.5$ Counterbore Depth 3.3	RU 42
45	8-M4 Through Hole	83	8- $\phi 4.5$ Through Hole $\phi 8$ Counterbore Depth 4.4	RU 66
65	8-M5 Through Hole	105	8- $\phi 5.5$ Through Hole $\phi 9.5$ Counterbore Depth 5.4	RU 85
97	10- $\phi 5.5$ Through Hole $\phi 9.5$ Counterbore Depth 5.4	148	10- $\phi 5.5$ Through Hole $\phi 9.5$ Counterbore Depth 5.4	RU 124(G)
	10-M5 Through Hole			RU 124X
112	12- $\phi 9$ Through Hole $\phi 14$ Counterbore Depth 8.6	187	12- $\phi 9$ Through Hole $\phi 14$ Counterbore Depth 8.6	RU 148(G)
	12-M8 Through Hole			RU 148X
139	12- $\phi 9$ Through Hole $\phi 14$ Counterbore Depth 8.6	217	12- $\phi 9$ Through Hole $\phi 14$ Counterbore Depth 8.6	RU 178(G)
	12-M8 Through Hole			RU 178X
184	12- $\phi 11$ Through Hole $\phi 17.5$ Counterbore Depth 10.8	270	12- $\phi 11$ Through Hole $\phi 17.5$ Counterbore Depth 10.8	RU 228(G)
	12-M10 Through			RU 228X
240	16- $\phi 14$ Hole $\phi 20$ Counterbore Depth 13	350	16- $\phi 14$ Through Hole $\phi 20$ Counterbore Depth 13	RU 297(G)
	16-M12 Through			RU 297X
385	24- $\phi 14$ Hole $\phi 20$ Counterbore Depth 13	505	24- $\phi 14$ Through Hole $\phi 20$ Counterbore Depth 13	RU 445(G)
	24-M12 Through			RU 445X

Bearing Type	Dimensions						Shoulder Height		Basic Load Rating (Radial)		Weight Kg
	Inner Ring	Outer Ring	Roller Pitch Diameter	Height	Chamfer	d_s	D_h	Cr KN	C0r KN		
	d	D	Dpw	B B1	r_{min}						
NRA 5008	50	66	57	8	0.5	53.5	60.5	5.1	7.19	0.08	
NRA 6008	60	76	67	8	0.5	63.5	70.5	5.68	8.68	0.09	
NRA 7008	70	86	77	8	0.5	73.5	80.5	5.98	9.8	0.1	
NRA 8008	80	96	87	8	0.5	83.5	90.5	6.37	11.3	0.11	
NRA 9008	90	106	97	8	0.5	93.5	100.5	6.76	12.4	0.12	
NRA 10008	100	116	107	8	0.5	103.5	110.5	7.15	13.9	0.14	
NRA 11008	110	126	117	8	0.5	113.5	120.5	7.45	15	0.15	
NRA 12008	120	136	127	8	0.5	123.5	130.5	7.84	16.5	0.17	
NRA 13008	130	146	137	8	0.5	133.5	140.5	7.94	17.6	0.18	
NRA 14008	140	156	147	8	0.5	143.5	150.5	8.33	19.1	0.19	
NRA 15008	150	166	157	8	0.5	153.5	160.5	8.82	20.6	0.2	
NRA 16013	160	186	172	13	0.8	165	179	23.3	44.9	0.59	
NRA 17013	170	196	182	13	0.8	175	189	23.5	46.5	0.64	
NRA 18013	180	206	192	13	0.8	185	199	24.5	49.8	0.68	
NRA 19013	190	216	201	13	0.8	195	209	24.9	51.5	0.69	
NRA 20013	200	226	212	13	0.8	205	219	25.8	54.7	0.71	



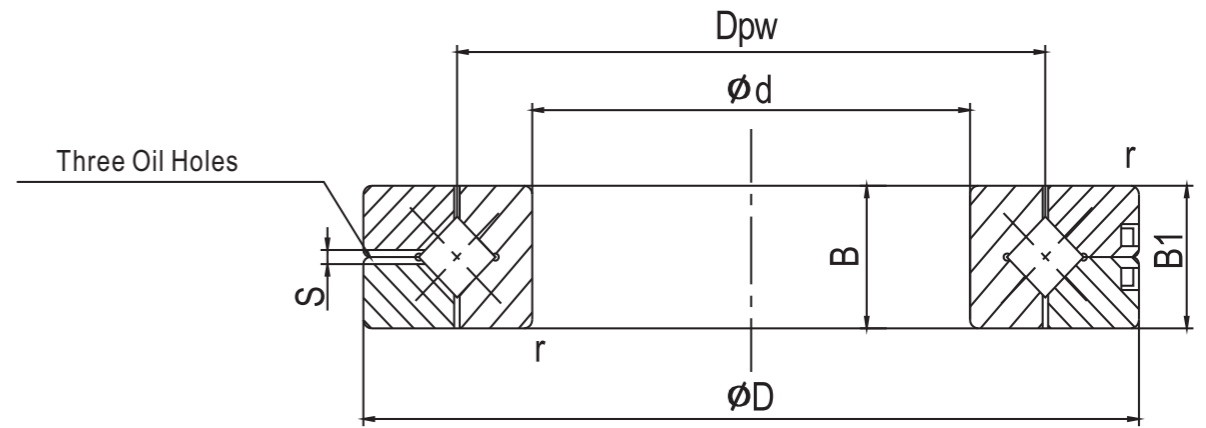
NBH Inner Ring/Outer Ring Integrity, Thin Section)



Bearing Type	Dimensions				Shoulder Height		Basic Dynamic Load Rating (Radial)		Weight Kg
	Inner Ring d	Outer Ring D	Width B	r min	d _a	D _a	Cr KN	C0r KN	
NBH 5013 A	50	80	13	0.6	56	74	17.3	20.9	0.29
NBH 6013 A	60	90	13	0.6	66	84	18.8	24.3	0.33
NBH 7013 A	70	100	13	0.6	76	94	20.1	27.7	0.38
NBH 8016 A	80	120	16	0.6	88	112	32.1	43.4	0.74
NBH 9016 A	90	130	16	0.6	98	122	33.1	46.8	0.81
NBH 10020 A	100	150	20	0.6	110	140	50.9	72.2	1.45
NBH 11020 A	110	160	20	0.6	120	150	52.4	77.4	1.56
NBH 12025 A	120	180	25	1	132	168	73.4	108	2.62
NBH 13025 A	130	190	25	1	142	178	75.9	115	2.82
NBH 14025 A	140	200	25	1	152	188	81.9	130	2.96
NBH 15025 A	150	210	25	1	162	198	84.3	138	3.16
NBH 20025 A	200	260	25	1	212	248	92.3	169	4
NBH 25025 A	250	310	25	1.5	262	298	102	207	4.97



NSX series (Inner Ring Integrity, Outer Ring Division, Thin Section)

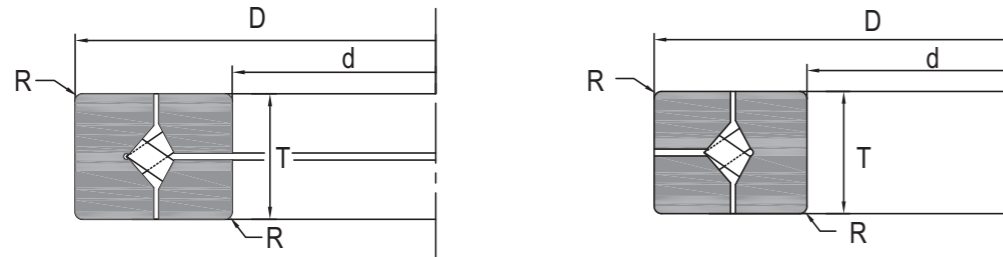


Bearing Type	Dimensions						Basic Load Rating (Axial)		Basic Load Rating (Radial)		Weight Kg
	Inner Ring d	Outer Ring D	Roller Pitch Diameter Dpw	Width B B1	Oil Holes s	r	Ca KN	C0a KN	Cr KN	C0r KN	
NSX 11814	70	90	80	10	1.2	0.6	18	60	12	30	0.3
NSX 11818	90	115	102	13	1.2	1	26	96	17	47	0.4
NSX 11820	100	125	112	13	1.2	1	28	106	18	52	0.5
NSX 11824	120	150	135	16	1.5	1	41	153	26	75	0.8
NSX 11828	140	175	157	18	1.5	1.1	64	237	41	116	1.1
NSX 11832	160	200	180	20	1.5	1.1	69	272	44	133	1.7
NSX 11836	180	225	202	22	2	1.1	98	381	63	187	2.3
NSX 11840	200	250	225	24	2	1.5	106	425	68	208	3.1
NSX 11848	240	300	270	28	2	2	149	612	95	300	5.3
NSX 11860	300	380	340	38	2.5	2.1	245	1027	156	504	12
NSX 11868	340	420	380	38	2.5	2.1	265	1148	167	563	13.5
NSX 11880	400	500	450	46	2.5	2.5	385	1699	244	833	24
NSX 118/500	500	620	560	56	2.5	3	560	2538	355	1244	44



Crossed taper roller bearing

Features and applications



Crossed taper roller bearings are designed to offer the highest levels of rotational accuracy and rigidity while conserving space and saving material costs. The bearing features two sets of races and taper rollers brought together at right angles with alternate taper rollers facing in opposite directions. They also have a nylon separator between the taper rollers to avoid the mutual friction between rollers and the overturning effect. This reduces the rotation torque that can bear the combined radial loads, axial loads and overturning moments.

These bearings adopted the design of a large cone angle and taper, which give a larger strided distance. The extension line intersection point of the raceway of a taper roller is located on the rotation middle line of the bearing. This makes the taper roller roll smoothly while working, avoiding friction with the raceway. This makes the speed higher than a crossed roller bearing and the friction torque lower.

Crossed taper roller bearing features:

- 1.High precision: precision at P4, P4,P2.
- 2.High rigidity: these series bearings are with preload.
- 3.High load capacity: can support radial load, axial load, and tilting load.
- 4.High speed: rollers in the raceway, making the limited speed of crossed taper roller bearings higher than that of crossed cylindrical roller bearings.
- 5.Low friction: the frictional torque of crossed taper bearings is much lower than that of crossed cylindrical roller bearings.
- 6.Compact structure: small installation space.

Application:

Crossed Taper Roller Bearings are suited to applications where space is limited or a mass with a low center of gravity such as in accurate machined tools with circular division notary tables, vertical and horizontal boring machines, vertical grinders, rotary surface grinding machines, vertical lathes, and large-scale gear hobbing machines.

Figure 18 is the most common form of this type, It is composed of an outer ring with a double raceway and 2 inner rings, the bearings can be used in conditions requiring notational accuracy of the outer ring.



Tolerance and precision

Crossed taper roller bearings have very high precision. Common precision classes are P5 class and P4 class. If you need detailed tolerance and precision measurements, please contact NPB.

Lubrication

There are oil holes on the inner rings or the outer rings of crossed taper roller bearings to add grease easily. For the work condition with high speed, heavy load and impact load, please contact with NPB.

Fit and installment

These bearings can bear the combined radial loads, axial loads and overturning moments, so there is no need to fit other bearings. The dimension fluctuations caused by expansion on heating and contraction on cooling do not effect the bearings. We suggest to use interference fit for the inner rings and outer rings with the shaft and the bearing to improve the bearing rigidity. If you need detailed fit tolerance, please contact with NPB.

We can make preload on the inner rings through the intermediate ring on the shaft. The preload depends on the width of that. So the user should make the intermediate ring according to the use.

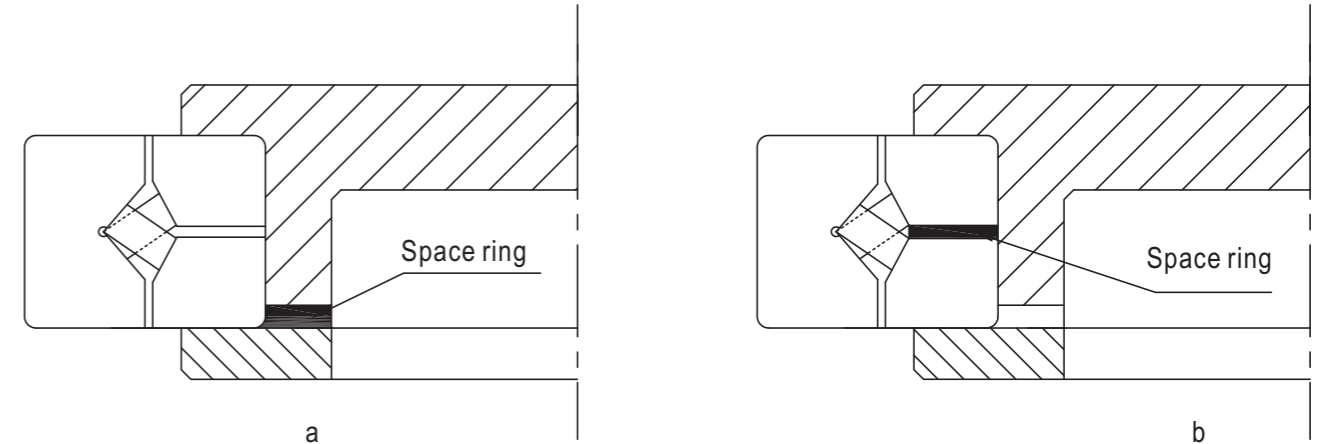


Figure a and b, show 2 kinds of preload: adding the intermediate ring on the shaft and adding the intermediate ring between two inner rings. The size of the bearing adjacent structure must be correct to make sure the bearing rigid.

For easy installment, there are lifting eyes on a crossed taper roller bearing whth a diameter more than 300mm. The belts can be taken away from after installment.